



PATENT
IBM-263 (YOR919990002)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Chari, et al.
Serial Number	:	09/227,770
Filing Date	:	January 18, 1999
Examiner	:	Jenise E. Jackson
Group Art Unit	:	2131
For	:	OBLIVIOUS PROXYING USING A SECURE COMPUTER

TO: The Honorable Commissioner of Patents
and Trademarks
P.O. Box 1450
Alexandria VA 22313-1450

APPEAL BRIEF

Sir/Madam:

Three copies of this brief are submitted in support of Applicants' appeal of the Examiner's rejections of claims 7, 9 - 13, 40 and 59 and in the above-identified application. The Appeal Fee for filing a brief in support of this Appeal in the amount of \$500.00 and any other fees required should be charged to Deposit Account 50-0510. An extra copy of this authorization page is enclosed. This Appeal Brief is organized in accordance with the format set forth in 37 C.F.R. 41.37 and found in Section 1205 of the Manual of Patent Examining Procedure.

1. **REAL PARTY IN INTEREST**

The Real Party in Interest in this Application is *International Business Machines Corporation*, Armonk, NY which has authorized this appeal.

2. **RELATED APPEALS AND INTERFERENCES**

There are no other appeals or interferences pending that relate to this case.

3. **STATUS OF CLAIMS**

The status of the claims with respect to the instant application is as follows:

Pending: Claims 7, 9 - 13, 40 and 59.

Canceled: Claims 1 - 6, 8, 14 - 39, 41 - 58.

Appealed: Claims 7, 9 - 13, 40 and 59.

4. **STATUS OF AMENDMENTS**

There was an amendment, and a later supplemental amendment, filed in response to the final rejection dated May 4, 2006. Claim 9 was canceled therein. These amendments did not result in allowable claims.

5. **SUMMARY OF THE CLAIMED SUBJECT MATTER**

There are two independent claims, i.e., Claim 7 and Claim 40. Pursuant to the provisions of the Manual of Patent Examining Procedure §1205, citing 37 C.F.R. 41.37, (c)(1)(vii), and in view of the rejection of independent Claim 7 and 40 on the same grounds by the Examiner, Applicants select Claim 7 as being the independent Claim that this Honorable Board should consider in its deliberations as determinative of the patentability issue .

The elements of the broadest claim (7) are set forth hereinafter with the supporting cite for the specification page and line(s) following. The language of claim 7 is:

“A method for providing secure communications on a network, the method comprising:
providing a secure communication for between a client and a server employing an
untrusted proxy by means of: (page 6, lines 1 - 22).

employing said proxy between said client and said server to provide connection links
between said client and said server; (page 10, lines 8 - 10).

embedding a secure coprocessor for use as an agent of said client and/or said
server which assures that said proxy cannot tamper with the functioning of said agent and
view unencrypted communication between said client and said server, said agent being a
software program or hardware logic operating within the confines of said secure
coprocessor; (page 10, lines 10 - 13); page 24, lines 8 - 10).

said proxy receiving a specific encrypted communication request from said client;
(page 3, lines 14 - 25; page 11, lines 17 - 21).

said coprocessor is located at the site of said proxy and: (a) acts as a converter between at
least one protocol said client supports, and at least one other protocol supported by said
server, (b) guarantees that an application embedded in said coprocessor performs to a
degree of security proscribed by said client and/or said server; (page 11, lines 12 - 26).

said proxy forming an n-tuple for a specific communication; (page 19, lines 20 - 26).

said proxy forwarding said n-tuple to said coprocessor; (page 19, lines 20 - 26).

said coprocessor generating a response, including a directive to said n-tuple; (page 20,

lines 15 - 18; page 25, lines 18 to 26).

said coprocessor sending said response to said proxy and (page 20, lines 15 - 16).

said proxy implementing a directive; (page 20, lines 17 - 18) and

employing the respective security protocols of said at least one protocol and said at least one other protocol; (page 20, line 19 to page 22, line 8).

splicing a plurality of secure communication protocols of different protocol suites into the agent, wherein the step of splicing a plurality of secure communication protocols is a security protocol of a Wireless Application Protocol Suite (WAP) to that of an Internet Protocol (IP) device, said WAP being used by a pervasive computing device, and said agent performs at least one content adaptation function. (page 22, line 9 to page 24, line 7).”

The language of independent Claim 40 is:

Claim 40. “ A computer program product comprising a computer usable medium having computer readable program code means embodied therein for providing secure communication on a network, (Total Specification, Figures 1 - 8) the computer readable program code means in said computer program product comprising computer readable program code means for causing a computer to effect:

securely embedding an agent at the site of a proxy in the network, (page 10, lines 10 - 13; page 24, lines 8 - 10) and

splicing a security protocol of a Wireless Applications Protocol suite (WAP) to that of the Internet Protocol (IP) suite (page 22, line 9 to page 24, line 7).”

6. GROUND OF REJECTION TO BE REVIEWED ON APPEAL

Claims 7, 10 - 13, 40 and 59 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cashman (US 6,209,087) in view of Lincke. (US 6,397,259). The Examiner asserts that Cashman discloses every element found in Applicants' claims, except that the reference does not disclose a plurality of secure communication protocols of different protocol suites into the agent, wherein the step of splicing a plurality of secure protocols is a security protocol of a Wireless Security Protocol (WAP) to that of an Internet Protocol (IP) device. The Examiner contends that Lincke discloses splicing a plurality of secure communication protocols of different protocol suites into the agent, wherein the step of splicing a plurality of secure protocols is a security protocol of a Wireless Security Protocol (WAP) to that of an Internet Protocol (IP) device. The issue to be reviewed by this Honorable Board relates, inter alia, whether there is a proper basis to assert that the combination of references cited serve to render obvious the claims of the instant application. More specifically and further, whether the Examiner's obviousness rejection of the claims is incomplete as she has not provided the proper evidentiary foundation for the rejection. The predicate for the combination of Lincke with Cashman comes, not from the disclosures found in the text, but rather based upon the assumptions that the Examiner contends would occur in mixing the wired system of Cashman with the wireless system of Lincke. It is Applicants' position that the two specific systems disclosed in Cashman and in Lincke are totally different and thus there is no proper basis to combine them.

7. ARGUMENTS

GROUND OF REJECTIONS AND ARGUMENT AS TO 35 U.S.C. § 103(a):

Single Ground of Rejection

Claims 7, 10 - 13, 40 and 59 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Cashman (US 6,209,087) in view of Lincke. (US 6,397,259).

As noted above, the present invention relates to secure proxying for computing devices. The invention is directed toward network security protocols which are used to insure privacy and integrity of communication on an open public network. These protocols are intended to achieve end-to-end security guarantees such that the communication is private to the entities that establish the parameters of the secure communication channel. Applicants emphasize that "Security guarantee" is a critical feature of the invention.

Pending Claim 7 defines the use of a secure coprocessor which is used to achieve end to end security guarantees in the protocol translation between client and server. This feature assures that the proxy cannot tamper with the functioning of the agent and view unencrypted communication between said client and said server. The agent is a software program or hardware logic operating within the confines of the secure coprocessor.

Cashman et al., as discussed later in greater detail, describe a method which uses a coprocessor to implement elements of the protocol translation process between client and server. The Examiner does not accept the premise that the coprocessor (which is under the control of the proxy) is trusted differently from the secure coprocessor in Applicants' claim which secure coprocessor enforces a very strong trust model. Claim 7 states that the protocols that the secure coprocessor will splice are the security protocols of WAP and SSL/TLS. The Examiner has acknowledged that this "splice" feature is not found in Cashman. In Cashman's system, the proxy is trusted to do the aforementioned protocol translation, and the coprocessor is used merely as performance-enhancing means. It is submitted respectfully that the Examiner has not interpreted the teaching of the Cashman reference correctly.

Note that in Cashman, the proxy can, and does tamper with what the coprocessor does. In Cashman, the proxy directly controls the coprocessor. Applicants re-emphasize that there is no end-to-end security guarantee being maintained by the protocol translation process of Cashman as is claimed in the present invention. The Cashman protocol translation process is different from that claimed by Applicants. This basic difference is essential in the overall obviousness rejection as the skilled artisan would properly interpret the teaching of Cashman contrary to the

Examiner's interpretation, and would consequently not make the unwarranted assumptions made by the Examiner in her rejections.

The unique feature of Applicants' invention is the trust model of the splicing. In Applicants' invention the secure coprocessor does not trust the server, whereas in Cashman, the CPU is an integral portion of the protocol translation. Note that in Cashman's scheme, the contents are available unencrypted to any agent/process on the proxy.

A key word in the present invention is "trust." In Applicants' invention, the coprocessor and the proxy do NOT trust each other. This concept is defined in Claim 7, which *inter alia* states: "embedding a secure coprocessor for use as an agent of said client and/or said server which assures that said proxy cannot tamper with the functioning of said agent and view unencrypted communication between said client and said server, said agent being a software program or hardware logic operating within the confines of said secure coprocessor..." The Examiner contends that the excerpt cited above is taught in Cashman at "...fig. 1, see col. 7, lines 48-65."

Applicants respectfully submit that the teaching at the location cited immediately above (or anywhere in the Cashman reference) does not teach the trust aspect as between coprocessor and proxy as Applicants are claiming. There is a distinct difference between what Applicants claim and what Cashman teaches. In Column 8, lines 5 - 8, Cashman says the CPU instructs the coprocessor to concurrently encrypt and compress and packetize data which it does and then notifies the CPU. This teaching of encrypting and compressing is no basis for properly asserting that Cashman meets the language excerpted above as to the role of the proxy as claimed. Cashman's words do not say what the Examiner says they do. The simple act of encryption and compression does not meet the function of the proxy. In reviewing the overall Cashman system, there is not the security (trust) feature in place as among the entities present which is claimed by Applicants.

Cashman does not disclose each and every element defined in Applicants' Claim 7, et al. In order to formulate a rejection, the Examiner thus cites Lincke, et al. to supplement the Cashman reference to supply the specific teaching that she asserts Cashman is lacking. Succinctly stated, the Lincke invention is focused on transcoding for wireless devices and optimizing the communication from the proxy to the client.

Lincke discloses an improved system and method for using a handheld device to access Internet information over relative low bandwidth networks. Lincke is directed toward a communications system which includes the wireless communications device, a server, and a source of data. The server acts as a proxy server. Typical sources of data are a web server or a mail server. In reviewing the Lincke, et al. patent, as noted below, the disclosure does not address the issue of splicing a plurality of secure communication protocols which is a security protocol of a WAP to that of an IP device. Essentially, Lincke seeks to optimize the number of messages sent to a wireless client.

The objective Lincke, et al. sought to emphasize was to consider wireless networks, such as two-way pagers and other wireless packet data networks, which provide wider coverage and lower cost than competing networks. These wireless networks typically have relatively low performance however. A single packet of 400 bytes can take eight seconds just to travel to the Internet and back when the system is lightly loaded. With such a low throughput, it could easily take minutes to download even a small web page using standard browser technology. The wireless communications system therefore employs novel methods for reducing the amount of traffic sent over the wireless link for web access. The skilled artisan would consider these deficiencies when reflecting on wireless communication systems.

Lincke, et al. wanted to provide the user with fast access to web content. Although the wireless communications device can access generic web content, because of the wireless communications device's limited screen size, most existing content will not be as visually appealing, will be harder to navigate, and may take longer to access than specially formatted content. Thus, significant advantages are achieved with customized content. The web content can

be formatted for the small screens of most handheld communications devices. This content will download relatively quickly (because of its small size). The formatted content can be created and published using the same tools used today for desktop web publishing (i.e. HTML tools and web servers) and could even be viewed using a standard desktop browser.

Applicants use the coprocessor in their invention to enforce a trust model between the client and the server. The secure coprocessor guarantees that no external entity can tamper with the functioning of the hardware logic or software programs. The use of the coprocessor in the present invention insures that end to end security is guaranteed. Again something that Cashman does not insure nor does Lincke even consider.

It is essential to note in the present invention, neither the proxy nor any external entity can tamper with the functionality being implemented by the software programs or hardware logic functioning within the confines of the coprocessor. This is not found in Lincke, et al.

Applicants respectfully submit that the specificity of the Cashman and Lincke disclosures in combination, do not render obvious or even imply the method of providing secure communication of the present invention as presently claimed. In the rejection, the Examiner is picking and choosing elements to the exclusion of what the references as a whole teach to one skilled in the art.

In order to analyze the propriety of the Examiner's obviousness rejections in this case, a review of the pertinent applicable law relating to 35 U.S.C. § 103 is warranted. Applicants contend that the Examiner has applied the Cashman and Lincke, et al. references using selective combinations to render obvious the invention.

Cashman at Column 1, lines 29 - 39 discloses that "During data communications, the manner in which bits of data are specifically arranged and the order in which they are exchanged between devices is called a protocol...There are many different types of protocols serving different purposes, but each typically involves a sending device that arranges data in one manner, and a receiving device that detects the specific arrangement of the data in order to make use of the data upon reception."

Cashman then discloses that the CPU is responsible for performing protocols on data and exemplifies the activities so performed. (Column 1, lines 51 - 63). Cashman cites examples of protocols which are in the prior art such as V.42bis, HDLC, SLIP and PPP and CRC. (Column 2, lines 5 - 63).

It is a column 3, lines 1 to 20, that Cashman states that these protocols “...suffer a variety of problems...” (Emphasis added) It is at Column 3, starting at line 21, etc. that Cashman details that his invention overcomes the problems with the prior art. He states that “The present invention provides a network device (with CPU) including a *unique co-processor* having symmetrical architecture and an extended processor instruction set...” See Column 5 for a detailed disclosure of the extension processor instruction logic circuits and specifically the “...XALU created according to this invention.” The manner in which the Cashman invention operates is detailed in Columns 5 and 6 of the patent.

Applicants respectfully point out that Columns 5 and 6 of the Cashman disclosure explain all of the many features of the system that make it, in his own words, *unique, i.e., being with out a like or equal*. The disclosure referred to above clearly establishes that there are many very specific features which must be considered when seeking to combine this reference with another. The skilled artisan, in reviewing the reference is going to interpret the teaching as applying to a network device having a CPU, etc., as described in Column 7, lines 48 - 65. The Cashman’s *unique* system is not designed for a wireless application.

Lincke discloses a wireless communications system. Lincke states in his preliminary remarks that in a high bandwidth network system, such as a wired network, (like Cashman) the usual techniques for browsing data on the Internet are adequate. (Column 3, lines 2 - 5). At Column 3, lines 6 - 32, Lincke explains how, using a wired CPU, one connects to the Web. He then explains at Column 3, line 33 etc., that “for low bandwidth networks, this *TECHNIQUE DOES NOT WORK WELL*.” (Emphasis added) Even if connected to a high bandwidth network, most handheld devices do not have screen area or processing power to display the graphics and

large amounts of text in a typical web page. Further problems with the prior art are found in Column 4, lines 5 - 40. It is clear that Lincke, in his disclosure, seeks to distance his invention from the wired networks and previous wireless systems.

The Lincke system is very specific. It contains specified elements used in the wireless communication system; it has a network topology with very specific protocols (which would not be compatible with the Cashman system) used to communicate among the various devices in the system; it has its own CML markup language, and other features unique to it alone.

The Examiner asserts that the language in Claim 7 “wherein the step of splicing a plurality of secure communication protocols is a security protocol of a Wireless Application Protocol Suite (WAP) to that of an Internet Protocol (IP) device,” is disclosed at col.9, lines 56-67, col.10, lines 1-2, col. 11, lines 8-25 of Lincke. Applicants respectfully disagree. There is no such disclosure at the locations cited in Lincke. The disclosure of Lincke at col. 11, lines 8-17 relate to a wireless system. There is no teaching in Lincke which positively equates the wireless system with the wired network systems. In fact, as cited above, Lincke states that they are different.

The Examiner’s obviousness rejection of the claims is incomplete as she has not provided the proper evidentiary foundation for the rejection. The predicate for the combination of Lincke with Cashman comes, not from the disclosures found in the text, but rather based upon the assumptions that the Examiner contends would occur in mixing the wired system of Cashman with the wireless system of Lincke. The two specific systems to Cashman and to Lincke are totally different. There is no proper basis to combine them.

The Court of Appeals for the Federal Circuit has set guidelines governing such application of references. These guidelines are, as stated are found in Interconnect Planning Corp. v. Feil, 774 F.2d 1132, 1143, 227 USPQ, 543, 551:

When prior art references require selective combination by the court to render obvious a subsequent invention, there must be some reason for the combination other than hindsight gleaned from the invention itself.

A representative case relying upon this rule of law is Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 5 USPQ 2d 1434 (Fed. Cir. 1988). The district court in Uniroyal found that a combination of various features from a plurality of prior art references suggested the claimed invention of the patent in suit. The Federal Circuit in its decision found that the district court did not show, however, that there was any teaching or suggestion in any of the references, or in the prior art as a whole, that would lead one with ordinary skill in the art to make the combination. The Federal Circuit opined:

Something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination. [837 F.2d at 1051, 5 USPQ 2d at 1438, citing Lindemann, 730 F.2d 1452, 221 USPQ 481, 488 (Fed. Cir. 1984).]

With respect to the combination of the Cashman and Lincke, et al. references, the Examiner has selected elements from these references for the sake of showing the individual elements claimed (e.g., protocol, server, proxy, client, agent) without regard to the total teaching of the references. As noted, the Examiner is improperly picking and choosing. The rejections are a piecemeal construction of the invention. Such piecemeal reconstruction of the prior art patents in light of the instant disclosure is contrary to the requirements of 35 U.S.C. § 103.

The ever present question in cases within the ambit of 35 U.S.C. § 103 is whether the subject matter as a whole would have been obvious to one of ordinary skill in the art following the teachings of the prior art at the time the invention was made. It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. (Emphasis in original) In re Wesslau 147 U.S.P.Q. 391, 393 (CCPA 1965)

This holding succinctly summarizes the Examiner's application of references in this case because she did in fact pick and choose so much of the Cashman and Lincke, et al. disclosures to support her position and did not cover completely in the Office Action the full scope of what these varied disclosure references fairly suggest to one skilled in the art.

As noted above, Lincke, et al. desire to provide the user with fast access to web content. Cashman teaches against Lincke's objective stating at Column 3, lines 6 - 8 that "*A CPU executing a program to compress and encrypt data must process data fast enough to fully utilize*

available data communications bandwidth. Fast processors are expensive and increase the cost of data communications devices." Lincke, et al. state that "*A goal of the invention is to provide the user with fast access to web content.*" The goals stated by these teachings are diametrically opposite. There is no basis to combine the references as has been done in the Official Action based upon their respective teachings and objectives. The Examiner in an Official Action in the initial stage of prosecution stated on the record that the Claims as extant were allowable (patentable) over Cashman alone. The Examiner then reversed her position and did another search and cited Lincke, et al. Essentially, the Lincke, et al. disclosure is a non-analogous art based upon its teaching with respect to Cashman.

Further, the Federal Circuit has stated that the Patent Office bears the burden of establishing obviousness, and that this burden can only be satisfied by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the reference.

Obviousness is tested by "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). But it "cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination." *ACS Hosp. Sys.*, 732 F.2d at 1577, 221 USPQ at 933. [837 F.2d at 1075, 5 USPQ 2d at 1599.]

The Court concluded its discussion of this issue by stating that teachings or references can be combined only if there is some suggestion or incentive to do so.

In the present case, the skilled artisan viewing the Cashman and Lincke, et al. references would not be inclined to combine the references but would be directed toward a totally different system than that which is defined in the pending claims in the instant application. There is no teaching in Lincke, et al. directed toward Applicants' objective of use a secure coprocessor to perform protocol translation in a manner that preserves the end to end trust model between the client and server. There is no mention of security and one cannot assume that combining the entire teaching of Lincke, et al. with Cashman would not compromise the Cashman system. The skilled artisan must consider the entire teaching of Lincke, et al. before combining it with

Cashman. Applicants' Claims define a "secure coprocessor" which explicitly means tamper resistant/ tamper-proof and further means that the coprocessor is translating protocols while still maintaining the trust model between the client and server. Neither Cashman nor Lincke, et al. disclose those elements. The combination is improper.

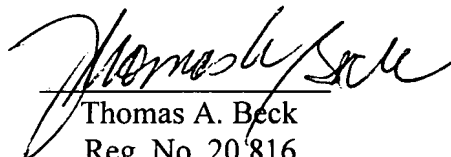
Claims 7, 10 - 13, and 59 are dependent upon Claim 7. Since the arguments applied to Claim 7 are persuasive as to its allowability, it follows that claims dependent thereon are also allowable.

The arguments set forth above relating to Claim 7 are hereby incorporated by reference with respect to Claim 40 and are applied thereto.

For reasons set forth in this arguments section, it is respectfully requested that this Honorable Board find Claims 7, 10 - 13, 40 and 59 as allowable.

July 16, 2007

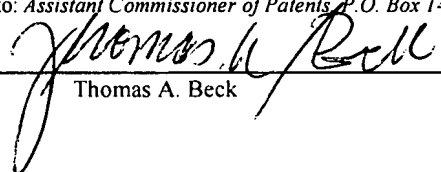
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I certify that 3 copies of this Appeal Brief are being mailed via the United States Postal Service, postage prepaid on the date shown below addressed to: Assistant Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Date: July 17, 2007

EVIDENCE APPENDIX

NONE

RELATED PROCEEDINGS APPENDIX

NONE



APPENDIX CLAIMS

1. (Cancelled) A method for achieving client to server end to end security guarantees, comprising:

providing a secure communication between a client and a server employing an untrusted proxy by means of:

employing said proxy between a said client and a said server to provide connection links between said client and said server;

embedding a secure coprocessor for use as an agent of said client and/or said server which assures that said proxy cannot tamper with the functioning of said agent, said agent being a software program or hardware logic operating within the confines of said coprocessor;

said proxy receiving a specific communication request from said client;

said coprocessor is located at the site of said proxy and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said server, (b) guarantees that an application embedded in said coprocessor performs to a degree of security proscribed by said client and/or said server;

said proxy forming an n-tuple for a specific communication;

said proxy forwarding said n-tuple to said coprocessor;

said coprocessor generating a response, including a directive to said n-tuple;

said coprocessor sending said response to said proxy and

said proxy implementing a directive; and

employing the respective security protocols of said at least one protocol and said at least one other protocol.

Claims 2 - 4 (Canceled)

Claim 5 (Canceled) A method as recited in claim 1 wherein the client is a pervasive computing device.

Claim 6 (Canceled) A method as recited in claim 5 further comprising the step of adapting content supplied by the client to fit constraints of the server and/or the connection links.

Claim 7 (Under Appeal) A method for providing secure communications on a network, the method comprising:

- providing a secure communication for between a client and a server employing an untrusted proxy by means of:

- employing said proxy between said client and said server to provide connection links between said client and said server;

- embedding a secure coprocessor for use as an agent of said client and/or said server which assures that said proxy cannot tamper with the functioning of said agent and view unencrypted communication between said client and said server, said agent being a software program or hardware logic operating within the confines of said secure coprocessor;

- said proxy receiving a specific encrypted communication request from said client;

- said coprocessor is located at the site of said proxy and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said

server, (b) guarantees that an application embedded in said coprocessor performs to a degree of security proscribed by said client and/or said server;

said proxy forming an n-tuple for a specific communication;

said proxy forwarding said n-tuple to said coprocessor;

said coprocessor generating a response, including a directive to said n-tuple;

said coprocessor sending said response to said proxy and

said proxy implementing a directive; and

employing the respective security protocols of said at least one protocol and said at least one other protocol;

splicing a plurality of secure communication protocols of different protocol suites into the agent, wherein the step of splicing a plurality of secure communication protocols is a security protocol of a Wireless Application Protocol Suite (WAP) to that of an Internet Protocol (IP) device, said WAP being used by a pervasive computing device, and said agent performs at least one content adaptation function.

Claim 8 (Canceled) A method as recited in claim 7 wherein the step of splicing includes splicing a security protocol of a Wireless Application Protocol Suite (WAP) to that of an Internet Protocol (IP) device.

Claim 9 (Canceled) A method as recited in claim 7 wherein the Wireless Application Protocol suite is used by a pervasive computing device.

Claim 10 (Under Appeal) A method as recited in claim 9 further comprising the agent performing at least one content adaptation function.

Claim 11 (Under Appeal) A method as recited in claim 10, wherein the step of performing includes maintaining communication privacy.

Claim 12 (Under Appeal) A method as recited in claim 10, further comprising maintaining a state of splicing process resulting from the step of splicing.

Claim 13 (Under Appeal) A method as recited in claim 12, wherein the step of maintaining includes employing a storage device external to the proxy, and using cryptographic means to encrypt the state.

Claim 14 (Canceled) A method for providing network security to a network employing a proxy, the method comprising:

- embedding a trusted application in a secure coprocessor located at the site of a proxy; and
- delegating to a network infrastructure a task of enforcing a trust model.

Claim 15 (Canceled) A method as recited in claim 14, further comprising guaranteeing that the application is trusted to enforce the trust model between at least one server and a plurality of clients.

Claim 16 (Canceled) A method as recited in claim 14, further comprising assuring the tamper resistance of the application.

Claim 17 (Canceled) A method for secure communication between a client and a server employing an untrusted proxy; the method comprising:

- embedding a coprocessor at the proxy;
- the proxy receiving a specific communication request from a client;
- the proxy forming an n-tuple for the specific communication;
- the proxy forwarding the n-tuple to the coprocessor;
- the coprocessor generating a response, including a directive, to the n-tuple;
- the coprocessor sending the response to the proxy, and

the proxy implementing the directive.

Claim 18 (Canceled) A method of claim 17, wherein the coprocessor is a secure coprocessor.

Claim 19 (Canceled) A method of claim 17, wherein the step of receiving includes:

- awaiting a connection request from a client;
- creating an entry in a storage module for the client;
- determining a sender of each received packet; and
- retrieving a stored entry.

Claim 20 (Canceled) A method of claim 19, wherein the n-tuple includes a sender id, an entry from a storage module and the received packet.

Claim 21 (Canceled) A method of claim 17, wherein the client and the server can be either a sender or a receiver, and the step of generating includes employing a first protocol from the sender to the proxy and a second protocol from the proxy to the receiver and translating between the first and second protocols.

Claim 22 (Canceled) A method of claim 21, wherein the translating includes decrypting the received packet as specified by the security parameters negotiated as per the first protocol and encrypting the decrypted packet as specified by the security parameters of the second protocol.

Claim 23 (Canceled) A method of claim 21, wherein the translating includes modifying the received packet to meet constraints of the receiver and wherein the directive includes forwarding to the receiver the packet resulting from the step of modifying.

Claim 24 (Canceled) A method as recited in claim 23, further comprising aggregating a plurality of packets into a group of packets and performing content adaptation on the group of packets.

Claim 25 (Canceled) A method of claim 17, wherein the communication between the client and the proxy employ protocols specified by the Wireless Application Protocol suite (WAP).

Claim 26. (Canceled) A system to control security of a proxy interconnecting a client to a server, comprising:

providing a secure communication between a client and a server employing an untrusted proxy by means of:

employing said proxy between a said client and a said server to provide connection links between said client and said server;

embedding a secure coprocessor for use as an agent of said client and/or said server which assures that said proxy cannot tamper with the functioning of said agent, said agent being a software program or hardware logic operating within the confines of said coprocessor;

said proxy receiving a specific communication request from said client;

said coprocessor is located at the site of said proxy and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said server, (b) guarantees that an application embedded in said coprocessor performs to a degree of security proscribed by said client and/or said server;

said proxy forming an n-tuple for a specific communication;

said proxy forwarding said n-tuple to said coprocessor;

said coprocessor generating a response, including a directive to said n-tuple;

said coprocessor sending said response to said proxy and

said proxy implementing a directive; and

employing the respective security protocols of said at least one protocol and said at least one other protocol;

said secure coprocessor, being used as an agent of the client and/or a server, said secure coprocessor being located at the site of said proxy ; said agent being a software program or hardware logic operating within the confines of said coprocessor and

an application embedded in said secure coprocessor which acts as a converter between at least one protocol said client supports and at least one other protocol supported by said server, wherein said secure coprocessor employs respective security protocols of said at least one protocol and said at least one other protocol; said secure coprocessor also assuring that said proxy cannot tamper with the functioning of said agent, and guaranteeing that an application embedded in said coprocessor performs to a degree of security proscribed by said client and/or said server.

Claims 27 - 29 (Canceled)

Claim 30 (Canceled) A system as recited in claim 26, wherein the application embedded in the coprocessor adapts content supplied by the server to fit constraints of the client and the connection links.

Claim 31 (Canceled) A system as recited in claim 30 wherein the application embedded in the coprocessor adapts content supplied by the client to fit constraints of the server and the connection links.

Claim 32 (Canceled) A system for providing network security to a network employing a proxy, the system comprising:

- a secure coprocessor located at the site of a proxy; and

- a trusted application embedded in the coprocessor wherein the coprocessor delegates the task of enforcing an arbitrary trust model to the application.

Claim 33 (Canceled) A system as recited in claim 32, wherein the coprocessor functions to guarantee that the application is trusted to enforce the trust model between at least one server and a plurality of clients.

Claim 34 (Canceled) A system as recited in claim 32, wherein the coprocessor functions to assure the tamper resistance of the application.

Claim 35. (Canceled) An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein for achieving client to server end to end security guarantees, the computer readable program code means in said article of manufacture comprising computer readable program code means for causing a computer to effect:

- employing a proxy between a client and a server to provide connection links between said client and said server;

- providing a secure communication between a client and a server employing an untrusted proxy by means of:

- embedding a secure coprocessor for use as an agent of said client and/or said server which assures that said proxy cannot tamper with the functioning of said agent, said agent being a software program or hardware logic operating within the confines of said coprocessor;

- said proxy receiving a specific communication request from said client;

- said coprocessor is located at the site of said proxy and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said server, (b) guarantees that an application embedded in said coprocessor performs to a degree of security proscribed by said client and/or said server;

- said proxy forming an n-tuple for a specific communication;

said proxy forwarding said n-tuple to said coprocessor;

said coprocessor generating a response, including a directive to said n-tuple;

said coprocessor sending said response to said proxy and

said proxy implementing a directive; and

employing the respective security protocols of said at least one protocol and said at least one other protocol;

said coprocessor is located at said proxy and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said server, (b) and guarantees that an application embedded in said coprocessor performs to a degree of security proscribed by said client and/or said server;

employing the respective security protocols of said at least one protocol and said at least one other protocol.

Claim 36 (Canceled) An article of manufacture as recited in claim 35, the computer readable code means in said article of manufacture further comprising computer readable program code means for causing a computer to effect the coprocessor assuring that the proxy can not tamper with the functioning of the agent.

Claim 37 (Canceled)

Claim 38. (Canceled) An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein for achieving client to server end to end security guarantees, the computer readable program code means in said article of manufacture further comprising computer readable program code means for causing a computer to effect:

employing a proxy between a client and a server to provide connection links between said client and said server;

embedding a secure coprocessor for use as an agent of said client and/or said server which assures that said proxy cannot tamper with the functioning of said agent, said agent being a software program or hardware logic operating within the confines of said coprocessor;

said coprocessor is located at said proxy site and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said server, (b) adapts content supplied by said server to fit constraints of said client and/or connection links.

employing the respective security protocols of said at least one protocol and said at least one other protocol.

Claim 39. (Canceled) An article of manufacture comprising a computer usable medium having computer readable program code means embodied therein for achieving client to server end to end security guarantees, the computer readable program code means in said article of manufacture further comprising computer readable program code means for causing a computer to effect:

employing a proxy between a client and a server to provide connection links between said client and said server;

embedding a secure coprocessor for use as an agent of said client and/or said server;

said coprocessor is located at said proxy site and: (a) acts as a converter between at least one protocol said client supports, and at least one other protocol supported by said

server, b) assures that said proxy cannot tamper with the functioning of said agent, and
(c) adapts content supplied by said server to fit constraints of said server and connection
links;

employing the respective security protocols of said at least one protocol and said at least
one other protocol .

Claim 40. (Under Appeal) A computer program product comprising a computer usable
medium having computer readable program code means embodied therein for providing secure
communication on a network, the computer readable program code means in said computer
program product comprising computer readable program code means for causing a computer to
effect:

securely embedding an agent at the site of a proxy in the network, and

splicing a security protocol of a Wireless Applications Protocol suite (WAP) to that of the
Internet Protocol (IP) suite.

Claim 41 (Canceled)

Claim 42. (Canceled) A computer program product comprising a computer usable medium
having computer readable program code means embodied therein for providing secure
communication on a network, the computer readable program code means in said computer
program product comprising computer readable program code means for causing a computer to
effect:

securely embedding an agent at a proxy in the network, and

splicing a plurality of secure communication protocols of different protocol suites into
said agent, wherein said splicing includes maintaining end to end security guarantees at
said server.

43. (Canceled) A computer program product comprising a computer usable medium having computer readable program code means embodied therein for providing secure communication on a network, the computer readable program code means in said computer program product further comprising computer readable program code means for causing a computer to effect:

securely embedding an agent at a proxy in the network, and

said agent performing at least one content adaptation function;

splicing a plurality of secure communication protocols of different protocol suites into said agent.

Claim 44. (Canceled) A computer program product comprising a computer usable medium having computer readable program code means embodied therein for providing secure communication on a network, the computer readable program code means in said computer program product further comprising computer readable program code means for causing a computer to effect :

securely embedding an agent at a proxy in the network, and

splicing a plurality of secure communication protocols of different protocol suites into said agent;

maintaining a state of said splicing process resulting from said step of splicing, wherein said step of maintaining includes employing a storage device external to said proxy, and using cryptographic means to encrypt the state of a splicing process resulting from the step of splicing.

Claim 45 (Canceled)

Claim 46 (Canceled) A computer program product comprising a computer usable medium having computer readable program code means embodied therein for providing network security to a network employing a proxy, the computer readable program code means in said computer program product comprising computer readable program code means for causing a computer to effect the steps of :

- embedding a trusted application in a secure coprocessor located at the site of a proxy; and
- delegating to a network infrastructure a task of enforcing a trust model.

Claim 47 (Canceled) A computer program product as recited in claim 46, the computer readable program code means in said computer program product further comprising computer readable program code means for causing a computer to effect the step of guaranteeing that the application is trusted to enforce the trust model between at least one server and a plurality of clients.

Claim 48 (Canceled) A computer program product as recited in claim 46, the computer readable program code means in said computer program product further comprising computer readable program code means for causing a computer to effect the step of assuring the tamper resistance of the application.

Claim 49 (Canceled) A program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform method steps for secure communication between a client and a server employing an untrusted proxy, said method steps comprising:

- embedding a coprocessor at the proxy;
- the proxy receiving a specific communication request from a client;
- the proxy forming an n-tuple for the specific communication;
- the proxy forwarding the n-tuple to the coprocessor;
- the coprocessor generating a response, including a directive, to the n-tuple;
- the coprocessor sending the response to the proxy, and
- the proxy implementing the directive.

Claim 50 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the coprocessor is a secure coprocessor.

Claim 51 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the step of receiving includes:

- awaiting a connection request from a first client;
- creating an entry in a storage module for the client;
- determining a sender of each received packet;
- retrieving a stored entry.

Claim 52 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the n-tuple includes a sender id, an entry from a storage module and the received packet.

Claim 53 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the client and the server can be either a sender or a receiver, and the step of generating includes employing a first protocol from the sender to the proxy and a second protocol from the proxy to the receiver and translating between the first and second protocols.

Claim 54 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the translating includes decrypting the received packet as specified by the security parameters negotiated as per the first protocol and encrypting the decrypted packet as specified by the security parameters of the second protocol.

Claim 55 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the translating includes modifying the received packet to meet constraints of the receiver and wherein the directive includes forwarding to the receiver the packet resulting from the step of modifying.

Claim 56 (Canceled) A program storage device readable by machine as recited in claim 55, said method steps further comprising the step of aggregating a plurality of packets into a group of packets and performing content adaptation on the group of packets.

Claim 57 (Canceled) A program storage device readable by machine as recited in claim 49, wherein the communication between the client and the proxy employ protocols specified by the Wireless Application Protocol suite (WAP).

Claim 58 (Canceled) A method as recited in claim 1, further comprising the step of the coprocessor adapting content supplied by the server to fit constraints of the client and/or the connection links.

Claim 59. (Previously presented) A method as recited in claim 7, wherein the splicing includes maintaining end to end security guarantees without a modification to a server involved in the communication